

lieve, that the Impediment of his Hearing was of the like nature with the other.

A New Discovery touching Vision.

This is the Title of two or three printed sheets of paper, lately sent from Paris to the Publisher, by the no less Obliging than Ingenious Monsieur Justel; In which are contained both an Epistle of the Discoverer Monsieur L' Abbe Mariotte, of Dyons, to Monsieur Pecquet, and the Answer to it. Of both which we cannot omit to give the Reader the substance in English, as follows,

HAVING often observed in Anatomical Dissections of Men as well as Brutes, that the *optick Nerve* does never answer just to the Middle of the bottom of the Eye, i.e. to the place, where is made the picture of the Objects, we directly look on; and that in man it is somewhat higher, and on the side towards the Nose; to make therefore the Rayes of an Object to fall upon the Optick Nerve of my Eye, and to find the consequence thereof, I made this Experiment;

I fastn'd on an obscure Wall, about the hight of my Eye, a small round paper, to serve me for a fixt point of Vision; and I fastned such an other on the side thereof towards my right hand, at the distance of about 2. foot; but somewhat lower than the first, to the end that it might strike the *Optick Nerve* of my Right Eye, whilst I kept my Left shut. Then I plac'd my self over against the First paper, and drew back by little and little, keeping my Right Eye fixt and very steady upon the same; and being about 10. foot distant, the second paper totally disappear'd.

That this cannot be imputed to the Oblique position of the second paper, is hence evident, That I can see other Objects further extant on the side of it: so that one would believe, the second paper were by a slight taken away, if one did not soon finde it again by the least stirring of one's Eye.

This Experiment I made often, varying it by different distances, and removing or approaching the Papers to one another proportionally. I made it also with my left Eye, by keeping my Right shut, after I had fastned the Second paper on the Left side of my point of Vision; so that from the *Site* of the parts of the Eye,

Eye, it cannot be doubted, but that this deficiency of Vision is upon the optick Nerve.

This Discovery I communicated to many of my friends, who found the same thing, though not always just at the same distances; which diversity I ascribed to the different situation of the Optick Nerve. You have made it your self, in his *Majesties* Library, where I shewed it to those of your *Illustrious Assembly*; and you as well as I, found the like variety, there being some, who, at the distances mention'd, lost the sight of a Paper, 8 inch. large, and others, who ceased not to see it, but when it was somewhat less; which appears not how it can be caused but by the differing magnitudes of the Optick Nerve in different Eyes.

This Experiment hath given me cause to doubt, Whether Vision was indeed perform'd in the *Retina* (as is the Common opinion) or rather in that other Membrane, which at the bottom of the Eye is seen through the *Retina*, and is called the *Choroides*. For if Vision were made in the *Retina*, it seems that then it should be made wherever the *Retina* is; and since the same covers the whole Nerve, as well as the rest of the bottom of the Eye, there appears no reason to me, why there should be no Vision in the place of the *Optick Nerve* where it is: on the contrary, if it be in the *Choroides* that Vision is made, it seems evident, that the reason, why there is none on the *Optick Nerve*, is, because that that Membrane (the *Choroides*) parts from the Edges of the said Nerve, and covers not the middle thereof, as it does the rest of the bottom of the Eye.

Upon this, I desire, you would give me your thoughts with freedom, since I am none of those that love to obtrude Conjectures for Demonstrations.

To which the main of M. Pecquets Answer is, as follows;

EVERY one wonders, that no person before you hath been aware of this Privation of Sight, which every one now finds, after you have given notice of it. But as to the *Sequele*, you draw from this Discovery, I see it not cogent, to abandon the Plea of the *Retina* for being the principal Organ of Vision. For (not to insist here on other considerations) it will be sufficient, now to take notice, that at the place of the *Optick Nerve* there is something

thing, that may very well cause this loss of the Object. *There* are the *Vessels* of the *Retina*, the trunks whereof are big enough to give a hindrance to Vision. These Vessels, which are no other but the ramifications of the Veins and Arteries, are derived from the Heart, and having no communication with the brain, they cannot carry thither the Species of the Objects. If therefore the Visual rays, issuing from an Object, fall on these Vessels at the place of their Trunk or main Body, 'tis certain that the Impression, made thereby, will produce no Vision, and that the picture of that Object will be deficient; as when on a white paper in an obscure Chamber, there is some black spot, or in it some hole considerably bigg: for the more sensible this blackness or hole is, the more of the image of the object it intercepts from our Eyes. It is not so in respect of the *small* ramifications, that issue from those trunks, and shoot into the *Retina*. For if they be met with at the place of the bottom of the Eye, where Vision is made distinct, they will not render the image of the Object deficient, because they are so small, as not to be sensible. Thus it is, that in Looking-glasses, when they want lead or tin in any place big enough to be perceived, the image, we there see, appears to have a hole; which happens not, when there is but so small a one, as might be made by the point of a needle.

Thus much being observed as to the deduction, made from this Experiment, I shall further note, That that paper, the sight whereof is lost, must be further or nearer off, according to the diversity of the structure of Eyes. For some loose this paper at the distance of two feet, some at a less, others at a greater distance; some loose it a little higher, others a little lower, according as the trunks of the vessels are situated in respect of the Optick Nerve; and some loose more of it than others, according as those vessels are bigger or smaller. And because 'tis hard to determine precisely the place, where the object is lost in all sorts of Eyes, we have ground to believe, that this loss is not always made on the extent of the *Nerve*, where the *Retina* is, but sometime besides it, where the *Choroides* is found. For the trunks of the Vessels of the *Retina* are big and long enough to extend on this or that side of the *Nerve*, and so to hide some part of the *Choroides*, according to their Magnitude. And in this case it will
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be true, that Vision is not made in all the parts where the *Choroides* is found, though they be exposed to the light. Which may very well give a check to your opinion, forasmuch as those trunks would hinder the objects, falling on them, from coming to the *Choroides*; which would render the image deficient in that place, in regard that those *species* would not be able to make an impression on the Organ of Vision through those vessels.

In the mean time, so pretty a discovery, as this is, could not belong without being confirmed. For as the secret of your Experiment consists in contriving, that the picture of an Object may fall just on the Optick Nerve, or thereabout, M. *Picard* hath devised a way, by which an object is lost keeping both Eyes open, by letting the image of the object fall on both the Optick Nerves at one and the same time, after this manner;

Fasten against a wall a round white paper, of the bigness of an inch or two, and on the side of this paper put two marks one on the right, the other on the left side, each about two foot distant; then place your self directly before the Paper, at the distance of about nine foot, and put the End of your finger over against your both Eyes, so that it may hide from the right Eye the left mark, and from the left Eye, the right mark. If you remain firm in that posture, and look steddily with both Eyes on the end of your finger, the paper, which is not at all cover'd thereby, will altogether disappear; which must be the more surprizing, because that without this particular encounter of the Optick Nerves, where no Vision is made, the paper would appear *double*, as you will finde as often as the finger shall not be placed as it ought to be, or when the sight is carried any thing sideways; whereof the reason is sufficiently known.

The application of this way is easily made to that of yours. For when one looks steddily with both Eyes on the End of one's finger, held before the marks, 'tis the same thing, as if you directed each eye by it self to the place, which is to be looked on to loose the paper; So that one may with *both* Eyes do the same thing, that you do with *one*, keeping the other closed, &c.